

AMENDMENTS TO THE CLAIMS

In the Claims:

Claim 1. (Currently amended) A recombinant *E. coli* host cell comprising one or more expression vectors, said expression vectors comprising alone or in combination:

- (a) methylmalonyl CoA mutase genes *mutA* and *mutB* from either *Propionibacterium shermanii* (SEQ ID No. 1 and 2) or *Streptomyces cinnamonensis* (SEQ ID No. 3 and 4), and
- (b) a *Propionibacterium shermanii* epimerase gene having the nucleotide sequence given in SEQ ID No. 5,

wherein the products of said methylmalonyl CoA mutase and said epimerase genes are effective to produce S-methylmalonyl CoA required for biosynthesis of a polyketide produced by a modular polyketide synthase (PKS) produced by at least one PKS gene in said host cell,

said PKS gene being contained in a vector that replicates extrachromosomally or is integrated into the chromosomal DNA of such host cell,

wherein said host cell, in the absence of said expression vectors, is unable to make said polyketide.

Claim 2. (Withdrawn) A recombinant host cell comprising one or more expression vectors that drive expression of enzymes capable of making a product and a precursor required for biosynthesis of the product in said host cell, wherein said host cell, in the absence of said expression vectors for said enzymes capable of making said precursor, makes said product in substantially lesser amounts due to said precursor being present in said host in limiting amounts.

Claim 3. (Withdrawn) The host cell of Claim 1 or 2, wherein said precursor is a primary metabolite that is produced in a first cell but not in a second heterologous cell.

Claim 4. (Withdrawn) The host cell of any of Claims 1 or 2, wherein said product is a polyketide.

Claim 5. (Withdrawn) The host cell of Claim 4, wherein said polyketide is a polyketide synthesized by either a modular, iterative, or fungal PKS.

Claim 6. (Withdrawn) The host cell of Claim 5, wherein said precursor is selected from the group consisting of malonyl CoA, propionyl CoA, methylmalonyl CoA, ethylmalonyl CoA, and hydroxymalonyl CoA.

Claim 7. (Withdrawn) The host cell of Claim 6, wherein said precursor is methylmalonyl CoA.

Claim 8. (Withdrawn) The host cell of Claim 7 that is either a procaryotic or eukaryotic host cell.

Claim 9. (Withdrawn) The host cell of Claim 8 that is an *E. coli* host cell.

Claim 10. (Withdrawn) The host cell of Claim 8 that is a yeast host cell.

Claim 11. (Withdrawn) The host cell of Claim 8 that is a plant host cell.

Claim 12. (Withdrawn) The host cell of Claim 9, wherein said polyketide is synthesized by a modular PKS.

Claim 13. (Withdrawn) The host cell of Claim 12, wherein said precursor biosynthetic enzyme is a methylmalonyl CoA mutase that converts succinyl CoA to methylmalonyl CoA.

Claim 14. (Withdrawn) The host cell of Claim 13, wherein said methylmalonyl CoA mutase is derived from propionibacteria.

Claim 15. (Withdrawn) The host cell of Claim 14, which has been further modified to overexpress a B12 transporter gene.

Claim 16. (Withdrawn) The host cell of Claim 15, wherein said B12 transporter gene is endogenous to *E. coli*.

Claim 17. (Previously amended) The host cell of Claim 1 in media that contains hydroxocobalamin.

Claim 18. (Withdrawn) The host cell of Claim 13 that further comprises an epimerase that converts R-methylmalonyl CoA to S-methylmalonyl CoA.

Claim 19. (Withdrawn) The host cell of Claim 18, wherein said epimerase is derived from propionibacteria.

Claim 20. (Withdrawn) The host cell of Claim 18, wherein said epimerase is derived from *Streptomyces*.

Claim 21. (Withdrawn) The host cell of Claim 12, wherein said precursor biosynthetic enzyme is a propionyl CoA carboxylase that converts propionyl CoA to methylmalonyl CoA.

Claim 22. (Withdrawn) The host cell of Claim 21 that has been further modified to overexpress a biotin transferase enzyme.

Claim 23. (Withdrawn) The host cell of Claim 22, wherein said biotin transferase enzyme is encoded by the *birA* gene.

Claim 24. (Currently amended) An *E. coli* host cell that expresses methylmalonyl CoA mutase genes mutA and mutB from either *Propionibacterium shermanii* (SEQ ID No. 1 and 2) or *Streptomyces cinnamonensis* (SEQ ID No. 3 and 4), and

a *Propionibacterium shermanii* epimerase gene having the nucleotide sequence given in SEQ ID No. 5, and

said host cell further expresses a modular polyketide synthase (PKS) gene or genes,

said PKS gene or genes contained in a vector that replicates extrachromosomally or is integrated into chromosomal DNA.

Claim 25. (withdrawn) A yeast host cell that expresses heterologous methylmalonyl CoA mutase and epimerase genes.

Claim 26. (Previously added) The host cell of Claim 1 that comprises two expression vectors, one of which is integrated into chromosomal DNA of said cell.

Claim 27. (Previously added) The host cell of Claim 1 that comprises two expression vectors, one of which is a plasmid.

Claim 28. (Previously amended) The host cell of Claim 1, wherein said methylmalonyl CoA mutase genes are the *Propionibacterium shermanii* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos: 1 and 2).

Claim 29. (Previously amended) The host cell of Claim 1, wherein said methylmalonyl CoA mutase genes are the *Streptomyces cinnamonensis* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos. 3 and 4).

Claim 30. (Previously amended) The host cell of Claim 1, wherein one or more of said genes is under control of a promoter from an *E. coli* gene.

Claim 31. (Previously amended) The host cell of Claim 1, wherein said PKS is 6-deoxyerythronolide B synthase.

Claim 32. (Previously amended) The host cell of Claim 17, wherein said methylmalonyl CoA mutase genes are the *Propionibacterium shermanii* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos: 1 and 2).

Claim 33. (Previously amended) The host cell of Claim 17, wherein said methylmalonyl CoA mutase genes are the *Streptomyces cinnamonensis* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos: 3 and 4).

Claim 34. (Previously amended) The host cell of Claim 17, wherein one or more of said genes is under control of a promoter from an *E. coli* gene or a gene.

Claim 35. (Previously amended) The host cell of Claim 17, wherein said PKS is 6-deoxyerythronolide B synthase.

Claim 36. (Previously amended) The host cell of Claim 24, wherein said methylmalonyl CoA mutase genes are the *Propionibacterium shermanii* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos: 1 and 2).

Claim 37. (Previously amended) The host cell of Claim 24, wherein said methylmalonyl CoA mutase genes are the *Streptomyces cinnamonensis* methylmalonyl CoA mutase genes mutA and mutB (SEQ ID Nos: 3 and 4).

Claim 38. (Previously amended) The host cell of Claim 24, wherein one or more of said genes is under control of a promoter from an *E. coli* gene.

Claim 39. (Previously added) The host cell of Claim 24, wherein said PKS is 6-deoxyerythronolide B synthase.

Claim 40. (withdrawn) A method for producing a polyketide, which method comprises culturing the host cell of Claim 38 under conditions such that said modular PKS gene is expressed to produce a functional PKS, said S methylmalonyl-CoA is produced, and said functional PKS synthesizes a polyketide that incorporates said S-methylmalonyl CoA.